

British S. S. Wells City:

Gale began on the 22d, wind S. Lowest barometer 28.67 inches at 2 a. m. on the 23d, wind W., 8 in latitude 50° 18' N., longitude 25° 45' W. End on the 23d, wind NNW. Highest force of wind 9; shifts SW.-W.-NW.

On the 24th a disturbance appeared central near latitude 53° N., longitude 32 W.; it drifted slowly eastward, apparently gaining slightly in intensity and on the 27th was between the 20th meridian and the European coast. Storm log:

British S. S. Canadian Leader:

Gale began on the 23d, wind S. Lowest barometer 29.49 inches at 4 p. m. on the 24th, wind WSW., 7, in latitude 53° 48' N., longitude 31° 26' W. End on the 28th, wind WNW. Highest force of wind 9, WNW.; shifts SW.-WNW.

From the 24th to 26th one vessel encountered winds of gale force in the Caribbean Sea. Unfortunately this was the only report received from craft in that locality, and it is therefore difficult to determine accurately the nature and extent of this gale. Storm log:

American S. S. Winnebago—

Gale began on the 24th, wind NE. Lowest barometer 29.81 inches at 6 p. m. on the 24th, wind NE., in latitude 11° N., longitude 75° 55' W. End on the 26th, wind ENE., 8; steady from ENE. and NE.

On the 28th the third waterspout of the month was encountered in the Gulf of Mexico, as shown by the following report:

In latitude 27° 55' N., longitude 87° 40' W., observed a large waterspout about 5 miles to the northeastward and moving north. Wind SE., force 2. Barometer 30.11 inches. Sea smooth. Temperature of the air 85° F., water 84° F. American S. S. *Hadnot*, Capt. F. Gibson, Chief Officer V. H. Casey.

On the 28th still another area of low pressure appeared over the eastern section of the ocean, central near latitude 48° N., longitude 25° W.; on the 29th it was near the southern shore of Ireland, and heavy gales prevailed over the region between the 15th meridian and the European coast. Storm logs:

British S. S. Saxonia:

Gale began on the 28th, wind NW. Lowest barometer 29.36 inches at 8:25 p. m. on the 28th, wind N., 12, in latitude 48° 51' N., longitude 19° 11' W. End on the 29th, wind N. Highest force of wind 12, N. Between 8 and 8:25 p. m. on the 28th, wind fell to moderate breeze and veered to westerly from WSW. At 8:25 p. m. wind veered to NW., in a hurricane squall. At 8:33 wind veered to N. and blew with hurricane force until 9:40 p. m., when it eased to force 9.

American S. S. Westerner:

Gale began on the 28th, wind S. Lowest barometer 29.28 inches at 11 p. m. on the 28th, wind S., 7, in latitude 48° 08' N., longitude 11° 52' W. End on the 29th, wind NW. Highest force of wind 12, NW.; shifts WSW.-W.

American S. S. Effna:

Gale began on the 27th, wind WNW. Lowest barometer 29.64 inches at 4 a. m. on the 29th, wind WSW., 8, in latitude 46° 35' N., longitude 12 W. End on the 29th, wind NNW. Highest force of wind 10, NNW.; shifts SSW.-WSW.-NW.

This disturbance moved rapidly northeastward and on the 30th was apparently over the North Sea, although, as during the last two days of the month no reports were received from vessels in these waters, it was necessary to depend on observations from adjacent land stations in order to determine approximately its position and character.

NORTH PACIFIC OCEAN.

By WILLIS E. HURD.

The greater part of the North Pacific Ocean was comparatively quiescent during August, and aside from the tropical storms of the Far East and one hurricane to the westward of the Hawaiian Islands, few disturbances of consequence were reported to have occurred.

Over the eastern part of the ocean pressure for the month was close to the normal. At Dutch Harbor the average of the p. m. observations (29 days) was 29.85 inches as compared with the normal of 29.88. This represented a net decline in pressure from that of the preceding month of July of 0.31 inch. The highest reading, 30.34 inch, was recorded on the 13th; the lowest, 29.32, on the 30th. At Midway Island the daily departures were unimportant, the absolute range for the month, considering p. m. observations only, being 0.16 inch. The highest reading was 30.12, on the 7th and 8th; the lowest 29.96, on the 23d. Average for the month 30.05 inches; normal, 30.06 inches. Pressure at Honolulu was also featureless, the absolute range there for the month being only 0.19 inch. The highest reading 30.06, occurred on the 25th; the lowest, 29.87, on the 18th. Average for the month, p. m. observations, 30.00 inches, normal, 29.99 inches.

Low pressure persisted throughout the month over some portion of the Aleutian area, but the conditions were those of summer, and no gale of force higher than 7 was reported. The only accession to the Aleutian low this month seems to have been a depression which originated about midway between Honolulu and San Francisco on the 13th. The depression deepened slightly on the 14th and moved slowly toward the Gulf of Alaska, emerging from the area usually occupied by the North Pacific high about the 21st. It seems not to have been accompanied by gales.

The trades prevailed in the Hawaiian area, with winds generally from the east at Honolulu. The maximum velocity at this point was 30 miles, from the east, on the 28th. There was much cloudy weather, the percentage of sunshine being the lowest in the 19 years of record.

The one feature of unusual interest in the weather conditions over west longitudes was the intense tropical cyclone which occurred on the 20th to 22d of the month between Hawaii and Midway Island. The storm is discussed elsewhere in this issue of the REVIEW under the title of "A tropical storm west of Hawaii," by Mr. Thomas A. Blair. The only additional information concerning the disturbance is to be found in the following report submitted by Third Officer H. E. Wollaston of the American S. S. *President Lincoln*, Capt. Ryland Drennan, westward bound:

Latitude and longitude of beginning, 24° 20' N., 163° 55' W.
Latitude and longitude of lowest bar., 25° 05' N., 165° 20' W.
Latitude and longitude of end, 25° 50' N., 167° 10' W.

Date and time.	Wind.	Barometer.	Air.	Sea.
Aug. 21:				
8:00 a. m.	SE. 7	29.96	79	77
9:00 a. m.	SE. 7	90	79	78
10:00 a. m.	SE. 7	85	79	78
11:00 a. m.	SE. 7-8	80	79	78
12:00 a. m.	SE. 8	75	79	78

8-12. Overcast, with heavy rain. Rough southeasterly sea and heavy swell.

Date and time.	Wind.	Barometer.	Air.	Sea.
Aug. 21:				
1:00 p. m.	SE. 9	29.58	78	77
1:30 p. m.	SE. 10	42	77	76
2:00 p. m.	SE. 10	34	77	76
2:30 p. m.	ESE. 11	20	77	76
3:00 p. m.	E. 12	29.00	77	76
3:15 p. m.	ENE. 12	28.80	76	76
3:30 p. m.	NE. 12-4-12	85	76	76
4:00 p. m.	NE. 12	82	76	76

12-4. Squally weather; wind, hurricane force, with frequent lulls. Heavy, continuous rain and mountainous seas throughout watch.

Sea and wind hauling to the north'ard all the time; 3:30 p. m. probably in center of hurricane, as wind died to moderate breeze for about 15 minutes, while mountainous seas were coming from all directions; 2:30 to 4 p. m. turned very dark.

Date and time.	Wind.	Barometer.	Air.	Sea.
Aug. 21:				
4:30 p. m.	NE. 12	28.86	76	76
5:00 p. m.	NNE. 12	88	75	76
5:30 p. m.	NNE. 12	96	75	76
6:00 p. m.	NNE. 12	98	74	76

4-6. Squally, wind coming in puffs. Hurricane force dying to strong breeze for a few minutes at a time. Overcast, with heavy rain. Very dark, sky brightening up at times.

Date and time.	Wind.	Barometer.	Air.	Sea.
Aug. 21:				
6:30 p. m.	N. by E. 12	29.34	74	76
7:00 p. m.	N. 12	32	73	75
7:30 p. m.	N. by W. 12	48	73	75
8:00 p. m.	N. by W. 12	58	72	74

Barometer going up in jumps. Oscillating considerably. Wind blowing steadily, hurricane force. Mountainous seas gradually moderating toward 8 o'clock. Overcast, with occasional clear spots appearing in sky. Continuous heavy rain.

Date and time.	Wind.	Barometer.	Air.	Sea.
Aug. 21:				
9:00 p. m.	N. by W. 11	29.65	71	73
10:00 p. m.	N. by W. 10	70	71	73
11:00 p. m.	N. 9	80	72	73
12:00 p. m.	N. 9-7	80	72	73

8-12. Wind and sea moderating steadily. Rain stopped. Sky clearing in places. Rough northerly sea with heavy northeast swell.

Date and time.	Wind.	Barometer.	Air.	Sea.
Aug. 22:				
1:00 a. m.	N. by E. 6	29.85	75	75
2:00 a. m.	N. by E. 5	86	76	75
3:00 a. m.	N. by E. 4	88	77	77

Rough northeasterly sea with long heavy swell. Overcast and cloudy to fine clear weather at 3 o'clock.

Toward the close of the month certain unsettled conditions off the lower west coast of Mexico leads to the belief that a tropical storm there was in some stage of development and that its activities ended in heavy rainfall. On the 27th and 28th easterly winds of force 8 occurred over the entrance and to the southward of the Gulf of Tehuantepec. These gales were reported by the American S. S. *Virginian* and the Norwegian S. S. *Ranenfjord*. Following this, the American S. S. *Thomas H. Wheeler*, Capt. L. S. McKenzie, southward bound, experienced continued east-southeasterly gales and heavy seas, and observed a slightly depressed barometer during the entire night of the 29th-30th. Near midnight the wind rose to force 9, lowest pressure 29.84 inches. Third officer B. A. Thompson, in his account of this disturbance, supposed the gale to have been one belonging to the "edge of a cyclone." The changing direction of the sea seemed also to confirm his supposition. To quote:

Our course during the storm was 116° true, and the seas were slightly on our port bow, though after midnight of the 29th a sea came over the starboard bow and carried away a large ventilator.

The local noon positions of this vessel were as follows: 29th, 18° 34' N., 105° 09' W.; 30th, 17° 34' N., 102° 44' W.

During the same night the American S. S. *Algonquin* experienced southeasterly to south-southeasterly winds, highest force 8, in and near latitude 19° 42' N., longitude 106° 22' W.

The American S. S. *Arizonan*, Capt. J. E. Tuttle, Los Angeles toward Balboa, was also involved. This vessel's lowest observed pressure was 29.82 inches, in 18° 55' N., 105° 25' W. Mr. A. Hamer, the second officer, thus reported:

August 30. Wind was hauling with a force of 10 from 12:30 a. m. to 2:45 a. m., ESE. to E. to SE. and at 4:00 a. m. settled down to East; at 5:00 a. m. shifted to SE. 10. 8:00 a. m. moderating, with wind SE. 8. 8:30 a. m. wind SE by S., force 7, barometer (corrected) 29.95. 9:00 a. m. SE. 6, barometer steady; heavy, driving rain squalls.

The following is quoted from the observer on board the American S. S. *E. L. Doheny III*:

August 31, 7 a. m. Ten miles south of Cape San Lucas had an exceptionally heavy rain squall which lasted for an hour. Rain is supposed to be almost unheard of on this coast. The wind was from the SE., force 4, barometer, 29.93 (corrected).

In the Far East pressure was low throughout August, and a number of depressions occurred, at least three of which developed into violent typhoons.

On the 1st of the month a depression appeared to the westward of Luzon. It crossed the China Sea on the 3d and 4th, and was felt as a cyclone of some energy along the lower China coast on the 4th to 6th. Capt. G. St. M. Stocker, of the pilot station on Double Island, Swatow, reported gales of maximum force 8 during a considerable part of the 5th, lowest pressure 29.40 inches. Several vessels experienced rough weather in the vicinity on the same date. The American S. S. *President Cleveland* was in Hongkong harbor during the storm, and with other vessels was warned to seek safety in the typhoon shelters. Second Officer Udley, the observer on board, reported a maximum wind force of 10 from the south-southwest, lowest pressure 28.88 inches. The British S. S. *Hyson*, Capt. A. S. Blues, Hongkong toward Manila, experienced squalls and heavy rain in the typhoon area; highest force of wind 8 from the southwest, lowest pressure, 29.33 inches, in latitude 21° 26' N., longitude 114° 53' E. The Japanese S. S. *Altai Maru*, Capt. H. Chiba, Hongkong toward Moji, encountered the full force of the storm while near latitude 22° 45' N., longitude 116° 50' E.; wind ESE., 12; lowest pressure, 28.31 inches.

A second disturbance followed closely in the wake of this typhoon. It appeared as a depression to the westward of Guam about the 3d, and by the 5th seems to have acquired a considerable degree of development over and to the southward of the Bonin Islands. On the 7th the Dutch S. S. *Saleier*, Captain Vollewens, Shanghai toward Singapore, encountered the southwesterly winds of this storm, highest force 7, lowest pressure 29.16 inches, in 25° 57' N., 120° 21' E. The *Altai Maru*, that had weathered the previous gale, was also caught on the 7th in the northern edge of the second storm, though less severely, the highest wind force observed being E. 8, lowest pressure 29.10 inches, in 26° 37' N., 119° 55' E. Considerably farther to the southward, the American S. S. *Dilworth*, Capt. D. S. MacAlpine, Cebu toward San Francisco, was also engaged with the storm. Her lowest observed pressure was 29.12 inches, highest wind force 10 SW., in latitude 16° N., longitude 136° 56' E. On the 9th the American S. S. *Stockton*, Capt. K. P. Olsen, Port San Luis toward Manila, was in 21° 51' N., 129° 42' E.,

or midway between the positions of the *Altai Maru* and the *Dilworth* on the 7th. At this point she experienced a southeast hurricane, lowest pressure 29.21 inches; heavy southeast to southwest sea and swell. The typhoon at 8 p. m. of the 9th was central slightly to the west-northwestward of Taiwan. No further reports of the storm are available at this writing.

The third typhoon of the month acted similarly to its predecessor. About August 11 it seems to have originated in the Marianas, moving thence west-northwestward until it struck Hongkong on the morning of the 18th. Here much damage was done to shipping and on shore, and there was a considerable loss of life. According to reports this typhoon is the worst experienced in Hongkong since 1906. Previous records of hurricane velocities and low pressures here are said to have been broken when the wind rose to 130 miles an hour, and the pressure fell to 28.66 inches. Among the marine casualties in the harbor were the British S. S. *Ming Sang* and the submarine *L-9*. The British S. S. *Mylie* was reported lost in the typhoon at sea on the 16th.

Fog was of frequent occurrence over the northern shipping routes, and was reported on 9 days outside of San Francisco Harbor. There were reports of fog on several days off the southern coast of Alaska, and in the Arctic Ocean between the 65th and 70th parallels.

ONE DEPRESSION AND ONE TYPHOON IN THE PHILIPPINES DURING JULY, 1923.

By Rev. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

Depression-typhoon of July 10 to 24.—This depression appeared on the 15th to the south of Guam, probably not far from 145° longitude E. and 6° latitude N. It moved WNW. and NW. by W. until the 17th, when it began to move westward, thus traversing the Philippines on the 18th through the southeastern part of Luzon, Marinduque, and the northernmost part of Mindoro. Although only a depression while crossing our Archipelago SE. and S. of Manila, it developed soon into a real typhoon in the China Sea. It moved WNW. from Mindoro to Paracels; but then on the 20th it recurved N. and probably even to N. by E. passing a few miles to the W. of Hongkong on the 22d. The steamers *President Taft* and *President McKinley* were involved in the storm while near Hongkong or anchored in Kowloon Harbor, Hongkong. The barometric minimum on board the steamer *President McKinley* was 29.18.¹ The typhoon was quite severe in Hongkong and Macao. Once in China, the typhoon inclined again westward. The daily positions of the center at 6 a. m. for the period July 17 to 22 were as follows:

July 17, 133° 05' longitude E., 10° 15' latitude N.

July 18, 126° 15' longitude E., 13° 20' latitude N.

July 19, 119° 20' longitude E., 13° 30' latitude N.

July 20, 114° longitude E., 15° 45' latitude N.

July 21, 112° 20' longitude E., 18° 15' latitude N.

July 22, 113° 05' longitude E., 20° 15' latitude N.

The Luzon and Hongkong typhoon of July 17 to 29, 1923.—This typhoon seems to have formed on July 17 to 18 to the south of Guam, not far from 144° longitude E. and 9° latitude N. It moved NW. on the 18th and 19th, W. from the 20th to the 23d or 24th. On the

24th, while in about 127° longitude and 16° latitude it took a WNW. direction, threatening the northernmost part of Luzon and the neighboring Colony of Hongkong. The barometric minimum observed in the Philippines was that of Aparri in the northern coast of Luzon, 733.9 mm. (28.89 inches) at 11 a. m. of the 25th. We do not know the exact minimum recorded at Hongkong, but the regular weather report for 6 a. m. of the 27th gave a barometric reading as low as 739.7 mm. (29.12 inches) with a gale blowing from NNW. The center must have passed practically over Hongkong or very close to the north.

The daily positions of the center at 6 a. m. for the period July 24 to 27 were approximately as follows:

July 24, 126° 40' longitude E., 16° 10' latitude N.

July 25, 122° 35' longitude E., 18° 05' latitude N.

July 26, 118° 30' longitude E., 20° 15' latitude N.

July 27, 114° 25' longitude E., 22° 20' latitude N.

Besides these two typhoons, another one was shown in our weather maps to the east and northeast of the Philippines. The center appeared on the 10th to the SE. of Yap in about 141° longitude E. and 6° latitude N. It moved WNW. first and then inclined northward about 300 miles to the E. of Luzon on the 12th. From the 13th to the 17th it moved practically north and finally filled up over the Eastern Sea near the Loochoos on the 17th.

A TROPICAL STORM WEST OF HAWAII.

By THOMAS A. BLAIR, Meteorologist.

[Weather Bureau, Honolulu, Hawaii, August 31, 1923.]

The U. S. S. *Vega* at noon August 20, 1923, encountered a well-developed tropical cyclone in latitude 21° 00' N., longitude 165° 00' W., about 450 miles west of Honolulu. Such storms are extremely rare in these waters, and indeed appear to have been previously unrecorded in the summer season. The excellent report of the storm made by Lieut. P. J. Gundlach, U. S. Navy, follows:

Left Guam for Pearl Harbor on 9th August, 1923. Up to 20th August very little change in weather conditions; about 50 per cent overcast and cloudy with some rain, wind from east and northeast, force 3 to 4.

About midnight 20th August wind increased to force 5, barometer normal. Wind increasing from that time, barometer falling slowly, 0.01 to 0.02 per hour. At 5 a. m. wind increased to force 7, same direction (45° true), barometer falling 0.04 in one hour. Heavy swells commenced from the southeast, wind veering [backing] to north. Heavy cross sea commenced. From 5 a. m. to noon wind increased from force 7 to 11 and barometer dropped from 29.84 to 29.32, largest drop 0.14 between 9 and 10 a. m. About 12:30 barometer commenced rising and wind veered [backed] to left to about northwest. From 1 p. m. wind veering [backing] to left, to west and then south, decreasing in force, weather moderating. At 5 p. m. wind south, force 6, barometer 29.71; barometer rising to 29.96 at midnight; no change in force and direction of wind. Then gradual change in wind to left, south to east, and barometer steadily rising to normal. Next day, conditions normal, sky clear.

At noon, 20th, at period of lowest barometer, sky cleared and sun shone brightly about 20 minutes, apparently "eye of storm center."

This was evidently a typical cyclone of small dimensions. On the same date high seas from the southwest occurred on the southwest coast of Kauai, approximately 21° 50' N., 159° 40' W. These subsided on the 21st. The only effect on the weather at Honolulu was the interruption of the trade winds on a portion of the 21st and 22d by light variable breezes from a southerly quadrant, accompanied by increased cloudiness, and on the 23d by the highest temperature recorded for two years.

¹ The barometric readings given in this article are not corrected for gravity.